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ABSTRACT

This paper describes an exploratory study of conceptual change in 91 students enrolled in an introductory course at Michigan State University designed to help beginning teacher education students examine critically their preconceptions. The data consist of essay responses written at the beginning and end of the term. The authors were interested in whether and how students' ideas changed over the course of the term, what factors influenced the changes, and whether the responses of students in a classroom participation observation version would differ from those in the nonfield version of the course. The study analyzed data along four dimensions that represent major themes in the course: (1) traditions of teaching; (2) the relationship of teaching and learning; (3) the contexts of teaching; and (4) the knowledge required of teaching. Besides illustrating changes in students' thinking, the paper also describes goals for student learning and activities that students undertake in the course. (Author/JD)

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Sharon Feiman-Nemser,
G. Williamson McDiarmid,
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National
Center for Research
on Teacher Education

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Research Report 89-1

CHANGING BEGINNING TEACHERS' CONCEPTIONS: A DESCRIPTION OF AN INTRODUCTORY TEACHER EDUCATION COURSE

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Abstract

This paper describes an exploratory study of conceptual change in 91 students enrolled in an introductory course at Michigan State University designed to help beginning teacher education students examine critically their preconceptions. The data consist of essay responses written at the beginning and end of the term. The authors were interested in whether and how students' ideas changed over the course of the term, what factors influenced the changes and whether the responses of students in the field version would differ from those in the nonfield version. Data are analyzed along four dimensions that represent major themes in the course: (a) traditions of teaching, (b) the relationship of teaching and learning, (c) the contexts of teaching, (d) the knowledge required of teaching. Besides illustrating changes in students' thinking, the paper also describes goals for student learning and activities that students undertake in the course.

CHANGING BEGINNING TEACHERS' CONCEPTIONS: A DESCRIPTION OF AN INTRODUCTORY TEACHER EDUCATION COURSE[1]

Sharon Feiman-Nemser, G. Williamson McDiarmid, Susan L. Melnick, and Michelle Parker[2]

Prospective elementary teachers do not come to teacher education feeling unprepared for teaching. From their years as pupils in elementary and secondary schools, they bring with them many ideas about teaching, learning, subject matter, and students. Spelling tests and reading groups, workbooks and recess, raised hands and reprimands are typical details in the picture of teaching that most students come with. These strong and enduring notions about teaching constitute a lens through which teacher education students perceive and interpret the preservice curriculum. Consequently their learning during teacher preparation is an interaction between the conceptions they bring and the knowledge and experiences they encounter. Unless teacher educators help their students surface and examine initial beliefs and assumptions, these taken-for-granted ideas may distort the lessons taught and learned during teacher preparation.

This perspective on teacher education students as learners has influenced the development of a required introductory education course at Michigan State University. Entitled "Exploring Teaching," the course is designed to help elementary education students confront and transform their ideas about teaching. If the goals of the course are met, students begin to see the overly simplistic nature of their initial views and develop an appreciation of teaching as an uncertain, contextually dependent, and intellectually demanding activity.

Overview of the Course

Students in the Exploring Teaching course examine three questions: What does it mean to teach? What does it mean to teach in school? What do teachers need to know in order to teach? Through personal reflection, analysis of case studies and videotapes of classroom teaching, discussions, readings, simulations, and field assignments, students explore the activities and traditions of teaching, the multiple and often conflicting purposes of schooling, and the intellectual requirements of their future career.

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[1]An earlier version of this paper was presented at the annual meeting of the American Educational Research Association, Washington, DC, April 1987. It will be published in the *Journal of Education for Teaching*. The authors would like to acknowledge the many faculty and graduate students who, over the past eight years, have participated in the development of this course. These include Deborah Ball, Henrietta Barnes, Bruce Cheney, Susan Florio-Ruane, Magdalene Lampert, Tim Little, and Linda Tiezzi.

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Two versions of the course are offered. One version includes four days of participant-observation in an elementary classroom. Each time they go to the field, students complete a field assignment that focuses attention on some aspect of classroom life. The other, "nonfield" version of the course substitutes peer teaching and analysis of videotapes of elementary classrooms and lesson transcripts for field experience. In other respects--such as readings and in-class activities--the two versions are quite similar.

This article describes the major course activities and illustrates the ways in which the course challenges prospective teachers' ideas and assumptions. The discussion draws on data collected in the form of essay responses written by two groups of students in each version--field and nonfield--of the course during the Winter Term 1987. During their first class, students were asked to write extemporaneously on the question "What is teaching?" Ten weeks later, as part of their final exam, students were asked the following question: "How have your ideas about teaching changed over the course of the term and what influenced the changes?" Instructors encouraged students to use their initial in-class "fastwrite" as "baseline data" in writing their responses.

We were particularly interested in whether students' views of teaching changed, the direction of the change, factors that influenced the changes and whether the responses of students in the field version of the course differed from those in the nonfield version. In analyzing students' responses, we looked for evidence of change in students' thinking, coding responses along four dimensions that represent major themes in the course: (a) traditions of teaching, (b) the relationship of teaching and learning, (c) the contexts of teaching, and (d) the knowledge required for teaching. For each, we coded whether or not the student discussed the dimension, whether or not they supported their discussion with specific references to readings or activities in the course, and our subjective judgment as to their level of understanding.

Below, we first describe each dimension and our goals for student learning. Next we describe the activities that students undertake to realize those objectives. We then illustrate the changes that appear to occur in students' thinking about each dimension. Finally, we discuss briefly our understanding of our findings.

Traditions of Teaching

At the beginning of the course, most students think of teaching as a simple and straightforward activity that results in learning. Teachers teach; students learn. Teaching is telling. Learning is listening to what the teacher says and giving it back more or less intact. The following is representative of student views written in the first class:

> In the beginning, when I thought about teaching, I saw a teacher standing in front of a blackboard, writing math problems on the board, while the students sat at their desks quietly. . . . I thought that a teacher merely opened up her

book and started there. She made dittos up to emphasize the important facts, but the answer could be found in the book.

Accustomed to "frontal teaching," and subject matter knowledge defined by textbooks, students often cannot imagine any other approach. Schooled on times tables and spelling lists, they have a hard time picturing teaching that evolves from students' ideas or interests or that emphasizes students' construction of knowledge. Defining learning as remembering what the teacher or the book says, they see themselves perpetuating this view:

> I would be at the head of the class in front of a bunch of neatly aligned rows of students sitting at their desks. I would have gotten most of my ideas from the materials that I remember using as an elementary student, for example, basal readers, SRAs, spelling books from levels A through H. . . . I pictured myself meeting with separate groups for reading and math. . . . I just thought that both teaching and student learning would come naturally.

Course Activities

Starting with the first class, students' unexamined belief that "teaching is telling" is challenged. After watching videotapes of two urban classrooms, students write and talk about what is being taught and learned in each setting. One videotape is a *60 Minutes* (CBS News, 1983) segment about Marva Collins, founder and teacher of Westside Prep in Chicago. The video depicts a teacher-centered classroom of pupils who are refugees from the public schools. The elementary pupils are shown answering factual questions about literary classics ("Who wrote the *Canterbury Tales*? How many pilgrims were there? Where were they going? Who was Thomas à Beckett?"), reading essays and poetry they have written ("This world needs good boys . . . ."), writing on the blackboard ("Who can come to the board and write 'Cleopatra'?"), receiving praise and the stuff of "cultural literacy" ("Very good--cum laude. What did I say? In what language?"). Ms. Collins is explicit about her purpose: To enable her pupils to get ahead, to get a good job, and to escape the poverty in which most live.

The second video, (Holmes n.d.) filmed at Central Park East, an alternative elementary school in New York City, depicts an open classroom where students pursue various activities on a common theme: Tutankhamen. The teacher, Leslie Stein, moves from group to group, asking questions ("So, how did you get this answer?"), generating suggestions ("What else might Ellen do--anyone got suggestions?"), intervening as needed to offer explanations, and insure that work is purposeful ("In the last couple of minutes, I feel like things have just fallen apart. Let's go around and find out what everyone is doing.")

While many of our students are surprised at the level of material pupils encounter in the first classroom, no one questions whether Collins is teaching and her pupils learning. They are not so sure that teaching is going on in the second classroom and, when asked,

describe Stein's purposes as "teaching kids to get along with one another." Students who pride themselves on being "hard-nosed" about education revere Collins for concentrating on the "basics" and excoriate Stein for failing to drill her pupils on times tables and spelling lists. With prodding from the instructor, students focus on the substance of the conversations among pupils in Stein's class as well as the demands of the tasks that the pupils have *chosen* to undertake. They find that these pupils are engaging sophisticated ideas--death, history, and duty, for example--and that, in working on projects, they spend most of their time reading, writing, discussing, and computing.

In subsequent classes, students examine other instances of teaching and learning such as Socrates "teaching" the slave boy in the *Meno* (Plato, 1982) and Vivian Paley's (1981) description of debates about measurement among her kindergartners. Each is an occasion for students to reexamine their understanding of teaching. Students also read Philip Jackson's (1986) descriptions of the two dominant traditions in teaching--knowledge reproduction and knowledge transformation. According to Jackson, when teachers treat knowledge as a commodity to be transferred to students, teachers test to find out whether students can *reproduce* it more or less faithfully. When teachers treat knowledge as something learners construct for themselves, teachers ask questions to stimulate student thinking as learners must *transform* knowledge to fit prior understandings and experience or revise their prior knowledge to fit their new understandings. Understanding the distinction between teaching for reproduction and teaching for transformation helps students realize that teachers have different purposes and that these purposes, in turn, are reflected in the questions they ask, the examples and illustrations they offer, the tasks they set, the opportunities they create for pupils to discuss their ideas and understandings, and the standards and methods they use to assess learning.

Changes in Students' Views of Teaching

Our data suggest that, during the course, students began to realize that teaching may be other than--and more than--what they assumed it to be. For instance, some commented on their understanding of what it means to teach:

> Teaching is a lot more involved and in depth than I realized. Teaching isn't just rattling off information or facts. A teacher has to be able to relay the information in a way that is interesting and understandable to the students. Before this class I thought of teaching as just giving a lesson, then the students did the work or asked questions about the assignment.

Other students emphasized the purposefulness of teaching:

> I now have an idea of the teacher's perspective of the classroom. I have a better understanding of what occurs "behind the scenes." Everything a teacher assigns, everything she discusses, are all part of her long range system of

> accomplishing goals. As an elementary student I saw homework as boring busy work; now I see that it was just a small part of my teacher's goals for her students.

Many students also seemed to recognize the critical role that their own schooling experience played in shaping their earlier views of teaching as they become aware of other conceptions of teaching:

> I was always taught by being lectured to, given the chance to ask questions, and then assigned a worksheet or a page from a book and I was ignorant of any other way to teach. [Vivian] Paley [1981] showed me another way--one of guidance. She guides her class by asking them questions such as "What if . . .?", "How can we . . .?", and tries to lead them to an understanding of the "best" way with questions like "Is there another way . . .?"

Another student who initially described teaching as "standing in front of desks in neat rows" could, at the end of the course, picture herself "taking a back seat":

> Seeing [videos of] Maggie [Lampert, 1986] and Leslie's [Stein, Holmes, n.d.] classrooms really inspired me to see teaching a whole different way. They made me see that it is not always what you say but what you ask that gets a kid's mind working. They helped me to see that kids are much more capable of learning than I ever thought they could be . . . I no longer see myself standing in front of desks in neat rows.

Students' conception of teaching, generally, seemed to evolve from a linear process by which knowledge is transmitted from teacher to student to a messier process in which teachers search for ways to assist pupils who are trying to understand subject matter:

> Through reading [Magdalene] Lampert [1985], I began to understand what is meant by learning by understanding. In elementary school I was told to memorize my multiplication and division facts, so I did. My teachers never stressed the importance of knowing the underlying facts and concepts. . . . To me memorization was the solution to academic success. . . . Lampert, on the other hand, . . . wanted her students to not only know the answer but understand why an answer is so.

Discussion

Helping students develop multiple images of teaching is made difficult by their lack of experience with anything but teaching as telling. Most of their classes at Michigan State University are lecture courses. When they do talk in class, they report that they do so in response to professors' questions intended to test their memory. Most report that their Exploring Teaching class is the *only* class they have taken in which they have had to discuss their understandings of concepts and are called on to elaborate or support their ideas.

Much of the course--the readings, classroom discussions and activities, videotapes, and written assignments--is devoted to convincing them that teaching for subject matter understanding, and not merely for recall, is not only possible but legitimate.

These efforts appeared to be somewhat successful: All 91 responses indicated some change in conceptions of teaching. Unsophisticated views of teaching as lecturing and directing passive learners "from the front of the room" gave way to more variegated images that incorporated activities such as "facilitating" and "guiding" in which the learner rather than the teacher is the center of activity and concern. Instead of assuming that learners are passive and lack ideas and knowledge, students indicated that they had come to think about pupils as active learners who bring to most topics prior experience and knowledge--sometimes erroneous.

The data we have used to document change in students' conceptions of teaching and learning could be considered suspect. How do we know that students aren't merely telling us what they think we want to hear? Our response to this is that we have other data--in the form of in-class written work, papers, responses to study questions, and classroom discussions--with which to compare students' responses to the question about change that we ask on the exam. As we do not follow students out into their own classrooms when they graduate, we cannot, however, say with certainty that the changes we describe in their conceptions are either truly profound or permanent.

The Relationship Between Teaching and Learning

How do you know when someone is teaching? Can there be teaching without learning? We pose these questions in order to explore the reciprocal yet uncertain relationship between teaching and learning. One of our goals is for students to understand that teaching necessitates taking responsibility for fostering pupils' learning. Having watched teachers in action for years, our students often view teaching as the sum of a set of behaviors--talking to students, lining them up to go to gym, comforting them, "shushing" them and so on. To be a teacher, one need only *act* like a teacher. That pupil learning may be the sine qua non of teaching is not a proposition our students have entertained.

While students need to understand that teaching involves accepting responsibility for learning, we also want them to understand the uncertainty that characterizes the relationship between teaching and learning. Teachers cannot always tell whether learning has occurred, the role that their activities have played, nor the long-term consequences of their efforts. This inherent uncertainty means that, from moment to moment, teachers cannot know with confidence that they are teaching. As students confront these issues, their confidence that teaching is easy and that anyone can do it is further eroded.

Course Activities

Students explore these issues through a variety of activities and assignments. For instance, early in the course, students teach a 10-minute lesson that they have created in small groups. In the ensuing discussion, they compare their intentions and beliefs about what they were teaching with their "pupils'" reports of what they actually learned. This exercise makes vivid and concrete the reciprocal yet uncertain relationship between teaching and learning. At the end of the activity, students confront the realization: "If my peers didn't understand or remember my lesson, was I really teaching?"

Students also read and discuss Philip Jackson's (1986) essays on the epistemological uncertainties of teaching and the reciprocal relationship between teaching and learning. Jackson quotes Dewey's analogy comparing teaching and learning to selling and buying:

> Teaching may be compared to selling commodities. No one can sell unless someone else buys. . . . There is the same exact equation between teaching and learning that there is between selling and buying. (p. 81)

Jackson distinguishes between teaching as an accomplishment and teaching as "an attempt to do something." This distinction seems to help students think through the difficulties inherent in Dewey's analogy. Jackson also discusses strategies that teachers use to find out whether their pupils are learning and understanding. These strategies provide a useful lens for viewing classroom videotapes and, for students in the field version, completing a major field assignment.

In the field version of the course, during their four days of participant-observation, students observe a lesson, interview the teacher about her intentions, and then interview two pupils to discover what they thought the lesson was about and what they learned. In this process, students uncover additional evidence of uncertainty: Not only do they discover that different pupils make sense of the same lesson in different ways but also that teachers' plans often go awry.

Changes in Students' Views of Uncertainty and the Relationship Between Teaching and Learning

Not surprisingly, most of our students reported that, prior to the course, they had never thought about the relationship between teaching and learning. As one student writes in the first class:

> I didn't know there was a difference between "to teach" and "to learn." I thought I could just be up in front of a classroom, demonstrating, discussing, lecturing, and giving examples and that was teaching. To be "teaching," a student has to be learning.

Another student expresses a similar view:

> Before I didn't make the distinction between the act of teaching and teaching when learning has taken place. Now after reading Jackson, I no longer see the term "teaching" as an all-encompassing catchall for the act of teaching. I now see learning as the reason and the judge of whether teaching has taken place.

Another wrote simply: "I thought my students would learn the material naturally or because I was their favorite teacher."

On the final several students expressed their emerging understanding of a teacher's responsibility for helping pupils understand:

> I never even thought of the fact that somehow the teacher has to present the material so that it is understandable to the students being taught.

> As [Philip] Jackson [1986] says, teachers can demonstrate and discuss all day, but until the kids start learning, the teacher isn't teaching. I now realize that students have a much larger part in the teaching process than I had ever thought before.

A third expressed his emerging viewpoint succinctly:

> You might have a Ph.D. in chemistry, but if you can't teach it so the kids understand, there's no learning and, in order to have teaching, there must be learning.

Some students discussed the need for teachers to understand how and what children think and to build on prior knowledge in order to promote learning. In explaining these insights, they referred to course readings and videotapes that presented instances of teaching for analysis and discussion:

> From watching Maggie [Lampert, 1986] and reading *Wally's Stories* [Paley, 1981], I can see that students have a lot of interesting thoughts in their minds and it takes only the right kind of teacher to get them out. . . . Both women were able to find out exactly what the children know and build on it from there.

> I learned from reading [Vivian] Paley [1981], [Magdalene] Lampert [1985] and Socrates [Plato, 1982] as well as participation in class that it is very important to base my [teaching] on what the students already know. As a teacher, I can guide and be the "feedback loop" to the students to help them develop and build on the knowledge they already possess.

For several students, the "mini-lesson" they taught their peers dramatized the need to connect with learners' prior knowledge and vividly illustrated the uncertain relationship between teaching and learning:

I had never really thought about what students might already know about a subject before we taught the mini-lessons in class. I had planned my lesson like I thought my students knew nothing about the subject, and I did not ask if they did. If I had known that they did know a little about the subject, I would have changed the lesson and only talked or lectured about half the time. Then I could have encouraged the discussion of my students' feeling or opinions of the subject.

When I was put in the role of the teacher there were many things running through my mind: Were my "students" learning anything? Did they understand what I was saying? Did I use the right examples?

Discussion

Uncertainty lies at the very heart of teaching. A primary source of emotional stress is not knowing whether one's actions actually influence pupils' understanding. Students in Exploring Teaching confront this aspect of teaching and most seemed to realize the difficulty of determining one's influence on students. Evidence that students actually grasp the implications of uncertainty for teaching was, however, tenuous.

Confronting the ideas of reciprocity and uncertainty seemed to produce some changes in students' thinking. Most had never considered the relationship between teaching and learning before. Still, students' comments reflected a wide range in levels of awareness. While most of the students in the nonfield sections made lengthier comments about the relationship between teaching and learning, their statements tended to be more global or more directly related to their experiences teaching the mini-lesson. Responses of students in the field version often focused on a single child they had observed rather than on learners in general. The course seemed to raise students' level of awareness about the reciprocal yet uncertain relationship between teaching and learning. We are skeptical, however, about the depth of understanding at this point in students' professional preparation.

Most students seemed inclined to deal with the ambiguity by searching for simple methods to reduce or, as some seemed to believe, eliminate uncertainty. In both class discussions and written work, many students seemed to resist acknowledging uncertainty as endemic to teaching. This resistance may be testimony to the strength of students' conventional image of the teacher as the person in charge. Serious and recurrent doubts about the efficacy of one's own actions contradicts this image. Resistance may also stem from students' perception that uncertainty cannot, in fact, be reduced appreciably and is, therefore, best forgotten.

For example, in responding to oral and written questions about how teachers can determine whether or not learning is occurring, most acknowledge that this is difficult but go on to reproduce--like a mantra to ward off evil--the four methods teachers commonly use to find out if pupils are learning that Philip Jackson (1986) identifies. Jackson identifies

these approaches to reveal their limitations; Exploring Teaching students tend to latch on to them as nostrums to cure uncertainty.

The Contexts of Teaching

Beginning teacher education students typically have given little thought to the contexts of teaching--either to the larger societal context or to the features of communities, schools and classrooms that influence teaching and learning. To help students begin to appreciate the influence of different contextual factors, they explore three issues: (a) the purposes of schooling; (b) the ways classrooms are organized; and (c) the hidden curriculum.

An activity that involves thinking simultaneously at several levels about a number of subjects, teaching is further complicated by the multiple and sometimes conflicting expectations that our society holds for schools. These expectations and the failure of policymakers and parents to establish clear priorities for teachers in meeting multifarious expectations both increase teachers' uncertainty about what to teach and their vulnerability to criticism (Goodlad, 1984). In the skirmishes between groups like fundamentalist parents and liberal school boards over the purposes of schooling, teachers and pupils are frequently caught in the crossfire.

The ways in which schools and classrooms have traditionally been organized to accommodate student diversity constitute another critical contextual factor in teaching. Beginning early in this century, ability grouping and tracking evolved as ways of addressing the diversity of pupils swept into public schools by the tide of immigration (Cohen, 1984; Oakes, 1986b). These organizational arrangements made teachers and administrators lives somewhat easier but, in practice, they have resulted in pupils who attend the same school being exposed to quite different knowledge (Goodlad, 1984; Cohen, 1984; Oakes, 1986b). While many parents and teachers believe ability grouping and tracking enables schools to address the individual needs of each child, research, particularly that carried out by Goodlad (1984) and Oakes (1986b), raises questions about the purposes--as well as *whose* purposes--these practices actually serve.

Finally, while students are familiar with the official academic curriculum, they have rarely thought much about the impact of the "hidden curriculum" (Jackson, 1968). They do not realize, for example, that teachers--and pupils--must manage a space that is crowded, an environment that is explicitly and implicitly evaluative, and relationships characterized by power vested almost entirely in the teacher. Neither have they thought about the interaction between the way teachers manage space, time, and relationships, on the one hand, and pupils learn the official curriculum.

Activities

Students draw on their observational "data" recorded during the viewing of the videotapes of Leslie Stein's (Holmes, n.d.) classroom at Central Park East and Marva Collins's (CBS News, 1983) classroom at Westside Prep to relate teachers' structuring of time, space, and relationships to their purposes. David Hawkins' (1974) model of the relationship among teacher, learner, and subject matter provides students with concepts to use in thinking about how relationships are structured in the classroom and how teachers' relationships with young people differ from those between young people and parents, social workers, ministers and other adults. Students in the field version of the course use these concepts as lens for looking in classrooms. For one field assignment, they draw a map of the classroom and keep a log of how time is spent. From data about the uses of time and space, they begin to draw inferences about the teacher's purposes. This exercise also involves them in thinking about the attributes of "academic" and "nonacademic" activities.

Students in the nonfield sections explore the question of what schools are for through a simulation of the *Mozert vs. Hawkins* (Clendenin, 1986) textbook case in which fundamentalist parents are pitted against the school board in a small Tennessee community. After reading about the case, students are assigned to argue on one side or the other or to serve as a judge who asks questions of each side. This activity dramatizes two conflicting yet compelling perceptions of the purposes of schooling--to reinforce parental values or to expand students' awareness and understanding of different values, lifestyles, and ideas. Students then assume the identity of a teacher in the school affected by the court's decision and speculate on how it will influence their classroom.

Finally, students describe in class their own experiences with ability grouping and tracking and read about research that questions the efficacy of these practices. In discussing the research and the pros and cons of tracking, students actually participate in "jigsawing"--an alternative to ability grouping (Slavin, 1983; Cohen, 1986). Students enrolled in the field version investigate the grouping practices in the classroom they observe, interviewing the teacher about her rationale for grouping. They also write a response to an actual letter from a parent objecting to heterogeneous grouping that she believes is hindering her daughter's progress.

Changes in Students' Understanding the Context of Teaching

While a primary objective of several of the course assignments and discussions is to increase student understanding of the multiple and conflicting purposes of schools, students seemed to become more aware of issues at the school and classroom level rather than at the broader, societal level. Comments from the final such as the following were typical:

> I never thought that the parents or even the principal could have any influence on the ways you teach. I thought you could teach your class [in] the ways you thought would be correct.
>
> Teachers have the responsibility to the students, parents, and themselves to give . . . the best possible education. That can be very stressful in itself.

Some students seemed to become more aware of the subtlety and influence of the hidden curriculum:

> I thought the world of teaching was pretty up front. . . . I now realize how much the hidden curriculum plays a part in school. The power, the praise, and all that goes along with that.
>
> I saw my cooperating teacher use the hidden curriculum often. Following the rules and obeying authority seemed to be an underlying theme in almost all they did.
>
> Learning about the hidden curriculum was something I didn't really know about. For as long as I have been controlled and shaped by it, I never realized what a great part it plays in the success of students.

Students appeared to find tracking and ability grouping a most compelling example of how societal expectations are embodied in school practices:

> When we first began the course I felt that advantages of tracking outweighed the disadvantages. I thought tracking and ability grouping to be good because for me it seemed to save the teacher lots of time and better suited the needs of the higher level students. I forgot one important issue, though--what about the lower-level students? What happens to them?
>
> [Mortimer] Adler's [1982, 1986] and [Jean] Oakes's [1986a, 1986b] articles have helped me to realize just what [tracking and ability grouping] accomplish. Basically, they exaggerate the differences between "low" and "high" achieving students, which is something I cannot support.
>
> [I] came to understand tracking as a process which holds the low achievers down. I also see a pattern developing in which the low achievers get put into the noncollege programs, get lower jobs, and their children are more likely to be put into low groups. . . . The cycle repeats itself again and again.

Discussion

The hidden curriculum and tracking and ability grouping are contextual factors all students have experienced. During discussions and in written assignments, students seemed to develop an appreciation for the role that spatial, temporal, and relational structures play

in teaching and learning. They also came to see how different structures reflect different priorities and values.

The quotations above suggest that, in general, few students evidenced an understanding of the broader societal influences on teaching that are highlighted in the course. Although we've designed activities to help students relate the purposes of schooling to teachers' actual practices--particularly, the ways that they structure time, space, and relationships--these ideas seemed to remain abstract for most students. Some do, however, respond to particular contextual factors operating at the level of the classroom.

Teacher Knowledge

What do teachers need to know to teach effectively? Beginning teacher education students, especially those planning to teach elementary school, rarely have given this topic much thought. When we ask our students, at the beginning of each term, why they want to teach, they are much more likely to cite their love of children than their love of learning. While acknowledging that teachers need content knowledge, most appear to have given little thought to what "knowing" a subject for the purposes of teaching means. Most seem to think that for teaching elementary subjects, they already know enough about mathematics, writing, social studies, and science. They believe textbooks and teachers' guides will bridge any gaps in their knowledge.

Nor do prospective elementary teachers regard their general college studies as sources of knowledge for teaching. They assume, as do many practicing teachers, that one learns to teach primarily through experience--"trial and error." From education courses they expect to get teaching methods and classroom management skills. To stimulate thinking about their preparation for teaching and to influence the way they approach professional studies as well as arts and science courses, students in TE 101 explore the nature and variety of teacher knowledge and the role that this knowledge plays in generating representations of subject matter.

Course Activities

Students analyze transcripts of a videotaped lesson they saw Ms. Lampert (1986) teach on graphs earlier in the course. They identify instances of knowledge in Lampert's teaching and, then, generate categories for these instances. Students subsequently explore these categories--knowledge of subject matter, teaching strategies, and learners--and use them to analyze other examples of teaching.

Students investigate, in particular, teachers' subject matter knowledge. In class, they discuss the distinction between content knowledge and pedagogical content knowledge (Wilson, Shulman, and Richert 1987). Content knowledge encompasses central concepts, modes of inquiry, and standards of evidence in a given field while pedagogical content

knowledge includes the examples, demonstrations, metaphors, and analogies teachers generate to explain critical concepts and their interrelationships. To make these concepts vivid and concrete, students read descriptions of subject matter teaching such as that of Herbert Kohl (1984) teaching *MacBeth* to 9 to 11-year-olds.

Students also discuss what they need to know about their learners--their culture, their preconceptions, their interests, their prior experience with the subject matter--to create appropriate representations of the subject matter. Throughout the course, students have seen various teachers create opportunities for pupils to talk about their understandings and interests and how this information shapes teachers' representations of subject matter.

Finally, to connect the exploration of teacher knowledge with learning to teach, students analyze, discuss, and write about two case studies of student teaching (Feiman-Nemser and Buchmann, 1983). In class discussions and in written analyses, students consider what the student teachers know and what else they need to learn. They also discuss when and where teachers learn what they need to know. By comparing the student teachers in the case studies with veteran teachers in other cases, students consider the skills and knowledge that can be learned in a preservice program with those that are learned at subsequent stages of learning to teach. Students then write about what they believe they themselves need to learn to be prepared to begin teaching and where they can learn these things.

Changes in Students' Views of Teacher Knowledge

The data seemed to reveal some change in students' understanding of what teachers need to know. Of the 91 student responses, 47 commented on teacher knowledge. In general, students described their preconceptions about what teachers need to know and how their ideas have changed.

Some responses revealed the kinds of beliefs and misconceptions about teacher knowledge that students brought with them to this introductory course. For example, several came to recognize that loving children may be necessary but is not sufficient. "I used to think it was enough to like kids to be a teacher. Now I know there is much more." Another observes, "I realize now that just a love of children is not enough. To be a good teacher, you have to have the proper knowledge and skills and know how to use them to the utmost."

Students also came with assumptions about the knowledge that teaching requires and about the adequacy of what they already knew. The widely held belief that teaching is easy complements the assumption that teachers do not need to know very much. As one student writes on the final:

> Before I walked into TE 101, I had no idea how much I needed to know in order to be a good teacher. I thought teaching was going to be easy. I would

> instruct and my students would merely absorb the material. I didn't realize there was much more knowledge I needed to know in between these two steps.

Others--second-year students at university--thought they already knew enough to teach:

> I had a pretty good understanding of content knowledge and how a teacher uses this knowledge. With this and a few methods classes, I thought I'd be ready to teach.

A frequently expressed belief was that subject matter knowledge is the only substantive requirement for teaching:

> Before this class I used to think that mastering subject matter was most important.

> I was under the impression that content knowledge was the only ingredient necessary to teach. I have never even thought of the fact that somehow the teacher has to present the material so that it is understandable to the student being taught.

Reading Wilson, Shulman, and Richert (1987) on the relationship between content knowledge and pedagogical content knowledge and applying their ideas to specific instances of teaching (e.g., by Kohl, 1984; Lampert, 1985; and Paley, 1981) introduced students to other kinds of knowledge teachers need. Students' understanding of the various areas of knowledge required for teaching seemed to reflect a continuum. Whereas some only mentioned categories of teachers' knowledge, others discussed the ideas in their own words, suggesting a deeper level of internalization and understanding, and a few not only elaborated on the categories but offer examples.

While a number of students used the terms "content knowledge" and "pedagogical content knowledge," their responses on the final did not always reveal their level of understanding. Occasionally a student explained the concepts and their importance. Several students in a nonfield section where this issue received considerable attention went beyond Shulman (1986) to link knowledge of subjects, pedagogy and students:

> Shulman explained the importance of content knowledge and pedagogical knowledge. A teacher must know the content and understand the underlying structure of it. This will help in teaching it to students. Several methods must be learned by the teacher in order for her teaching to be effective for her students learning. A teacher must have plenty of explanations, demonstrations, illustrations and analogies available to her students because there are always a few students that will have questions that must be answered.

> Shulman's article also changed many of my ideas. After reading his article, I realized that knowing about a topic isn't enough. The teacher must use the right examples and analogies to get an idea across. This is what he calls pedagogical content knowledge. The teacher must be able to build on the knowledge each student has and then relate it back through the students' experience so he can use it later.

> I found that a teacher must have knowledge of students, knowledge of pedagogy and knowledge of subjects. She needs to know how they [students] think, what they feel and what they know. Knowledge of pedagogy is knowing how to reach the students so as to help them understand and form new ideas. In order to do this, a teacher must have a certain knowledge of the subject. Without this knowledge, a teacher would not be able to explain clearly, answer questions, clear up misconceptions and stimulate discussion.

Some students also discussed the relationship between teacher preparation and learning to teach. Uneasy about their level of preparation in subject matter knowledge, some worried about whether and how they could acquire the knowledge they had come to realize they would need. "At first," one student confessed, "I panicked when I began to realize how much I would need to know. I was sure I would not be able to know enough." Readings and discussions subsequently seemed to help her realize that teachers do not have to know "everything" the first day they walk into their own classrooms; they can and, indeed, must continue to learn. As another student put it:

> Before, I thought I could learn about science (my major) and go from there, but now I see that I need to be aware of much more. And also that I will have to continue learning about my subject matter so I can further master it and approach it from different angles.

Discussion

Most of the students claimed that they began the course believing that they already had sufficient knowledge or that they didn't need to know very much to teach. At the end of the course, more than half of the students felt they needed to learn more--about subject matter, learners, and teaching. The notion that "loving children" is all teachers need appeared, for most students, to give way to an appreciation of the knowledge, skills, and understanding required to teach subject matter to children.

At the same time, the data leave us unsure about the depth of student understanding of the knowledge required for teaching. While students acquired new labels for the different kinds of things teachers need to know, they probably did not develop a clear idea about what it is teachers need to know about subject matter, learners, and teaching to create effective representations of knowledge. To achieve this level of understanding,

students would probably need to examine a particular subject matter area in considerable depth--a requirement not possible in the 10 week term.

Conclusion

Students who completed Exploring Teaching during the winter term of 1986 reported substantial change in their conceptions of teaching and learning. The changes they described were also evident in classroom discussions and written assignments. While we are aware that students in the course could be telling us what they think we want to hear, we feel the evidence that we have accumulated over the past four years points toward genuine changes at least in the ways students talk about the central themes in the course.

The image of teaching that they tend to bring with them from years observing teachers--"a teacher . . . standing at the blackboard demonstrating lessons"--appears to be transformed. Students began to realize that teaching involves more than merely telling. Not only did they come to see that learners play an active rather than passive role in learning, they also came to understand that learning is the sine qua non of teaching.

Some students reported a greater appreciation for the uncertainties of teaching--that is, the difficulty of knowing how teacher actions influence student understanding or development. Some students demonstrated a greater understanding of contextual factors--the culture of the classroom, the ethos of the school and community, and the expectations of parents and policymakers--that influence teaching and learning. Few, however, seem to understand the effects of the often conflicting purposes that society imposes on schools and teachers. Finally, nearly half the students indicated that their appreciation for what teachers need to know to teach--that is, the complex of knowledge, commitments, and skills--had increased.

While students' conceptions appeared to change, we have our own uncertainties about the data. Besides the activities and readings in the course, other factors probably contribute to these apparent changes, such as variability across the four instructors and the timing of discussions of the different themes. For example, traditions of teaching and uncertainty in teaching were stressed early in the term, while context and teacher knowledge were discussed at the end. This may account for the predominance of comments on what teachers need to know to teach, particularly from students in the nonfield version.

Because students in the field version spent four days as participant-observers in elementary classrooms, they had a third less time for discussion. Many students commented on the importance of class discussions in shaping their understanding of the central concepts. Thus these differences in opportunities to discuss their understandings of the central course ideas may have affected reported changes. Students in the field sections, for instance, were less likely to write about teacher knowledge in detail than were their counterparts in the nonfield sections.

The form of our data and the circumstances under which they were collected introduce other limitations. For some students, writing about complex ideas is a formidable task or, as one student wrote, "My ideas have changed in more ways than I can express in writing." Students were also answering questions as a part of the final examination in the course. Despite the fact that students had the question ahead of time so that they could review their notes, papers, and readings before writing, anxiety associated with exams and the understandable tendency for students to shape their responses to fit what they believe the instructor wants may also have biased our data. Finally, one instructor encouraged students to form study groups to prepare for the final. This instructor noted that his students' responses showed evidence of a "study group" effect--that is, all the students in a particular group tended to stress the same dimensions.

Despite these caveats, we remain confident that students' conceptions of teaching as an activity grew richer and more complex as a result of the course. We are less confident, however, that students' new conceptions will survive the remainder of their preservice preparation, much less continue to develop. Methods courses, in our experience, rarely address students' conceptions of the activity of teaching. Rather, such conceptions are implicit in the methods presented. Student teaching may be many things but rarely is it an opportunity to raise and try to answer questions about the nature of teaching.

In short, while conceptual change as a goal for classroom teachers is enjoying modest popularity with teacher educators, confronting and addressing teacher education students' preconceptions about teaching are rarely part of a preservice program. In recent years, cognitive science research has begun to enter the teacher education curriculum. Prospective teachers are taught about scheme theory and children's misconceptions and they learn that comprehension results from the interaction of reader and text (Resnick, 1983; Wittrock, 1986). Ironically, this perspective on learning has had little impact on what teacher educators do with their students. Instead of taking into account what teacher education students already know and believe, teacher educators often regard their students as lacking in professional knowledge and skill. Confronting and addressing students' preconceptions about teaching is rarely part of a preservice program.

The lack of attention to prospective teachers' prior beliefs and understandings may help explain why teacher education is such a weak intervention and why teachers often teach as they were taught. Unless teacher educators create opportunities for prospective teachers to examine and question their assumptions about teaching, learning, subject matter, they may complete their teacher education program without having to rethink their most fundamental beliefs.

Our efforts to bring about such conceptual change in beginning teacher education students appear to have achieved some modest success. While we continue to experiment

with the course, changing readings and activities to increase our effectiveness, we are encouraged by student responses such as the following:

> Perhaps what influenced me the most in this class is being able to express my ideas, feelings and opinions. This is something I would like to accomplish in my own teaching career.

The discussions and debates supported by the seminar format and stimulated by instructors who are themselves students of the central questions in the course constitute an object lesson: By attending the seminars, students learn that teaching can mean something more than a teacher standing in front of a class talking at passive students. They learn first-hand that teaching which addresses students' preconceptions and prior knowledge and engages them in genuine discussion can bring about conceptual change.

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